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Abstract

Background

Although rates of sexually transmitted infection (STI) tend to be higher in urban Canada, the province of British Columbia has recently seen above-average rates in the northern health regions.

Data and methods

Data from the 2005 Canadian Community Health Survey were used to examine sexual behaviour risks by geography and age in British Columbia. Two outcomes were investigated: ever diagnosed with an STI, and did not use a condom during last sexual intercourse. Region was categorized as metropolitan and non-metropolitan (Northern, representing more rural and remote communities, and Southern). Multivariate logistic regression was used to determine associations between the two outcomes and region, age, and other socio-demographic variables. Normalized weights accounted for sampling design.

Results

In adjusted analysis, older age (25 to 49) and being female were significantly associated with previously having an STI and not using a condom during last sex. Being a non-drinker was inversely associated with the former outcome, and being an occasional drinker was inversely associated with both outcomes, compared with being a regular drinker. When stratified by region, the relationship between older age and not using a condom was particularly strong in Northern non-metropolitan regions.

Interpretation

The results highlight the importance of considering older individuals in the design of STI preventive interventions, particularly in non-metropolitan and rural and remote regions, where access to testing and treatment may be limited.

Keywords

condoms, risk behaviour, rural health, rural health services, sex behaviour, sexually transmitted diseases

Authors

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Since 1997, rates of sexually transmitted infections (STIs) have risen in Canada. In 2007, there were 224.0 reported cases of genital chlamydia per 100,000 population, up more than 70% from 1997.[1] The rate of gonorrhea in 2007 was much lower—36.1 cases per 100,000 population—but it was more than 120% above the 1997 rate. And while reported cases of infectious syphilis were relatively rare, with a rate of 3.7 per 100,000 population in 2007, this amounted to a fivefold increase over 1997.

Typically, STIs have been concentrated in urban areas in Canada.[2,3] Recent research, however, indicates that some STIs are becoming more prevalent in non-metropolitan areas. This has been observed in the Canadian province of British Columbia, where rates in northern health regions have exceeded the provincial average in the past several years.[4] The boom-and-bust nature of resource-based industries in these areas may be a factor in the upturn in STI rates,[5-12] as such economies have been associated with increases in risky sexual behavior.[7-12]

According to the Public Health Agency of Canada, risk factors for STIs include being younger than 25, having unprotected sex, previously having an STI, and having a new or more than two sexual partners in the past six months.[13] As well, STI rates tend to be high in urban areas.[2,3]

Most attention focuses on adolescents and younger adults, as they are frequently at highest risk for infection.[3,14,15] Those in northern health regions encounter particular barriers to STI testing and treatment, including geographic inaccessibility and limited hours of operation of clinics, local social norms, and negative interactions with local health care providers.[9-11] Similar barriers may exist for older Canadians, but less research has examined STI risks among adults.

This study uses data from Statistics Canada's 2005 Canadian Community Health Survey (CCHS) to investigate the relationship between age, geographic region and risk factors for STIs in British Columbia. In 2005, when the survey was

conducted, the population of the province was about 4.3 million.

Methods

Study sample

British Columbia respondents aged 15 to 49 who replied "yes" to "Have you ever had sexual intercourse?" in the Sexual Behaviour Module of the 2005 CCHS were eligible for inclusion in this study. Those who had never had sexual intercourse were not asked the questions in the Module, and were, therefore, excluded from this analysis (Figure 1).

Measures

Two outcomes were examined: 1) ever diagnosed with an STI; and 2) did not use a condom during last sexual intercourse.[16,17] Both outcomes are cited as risks for STIs in the *Canadian STD Guidelines*[13] and in earlier research.[18-21]

The question about previous STIs was asked of British Columbia residents aged 15 to 49 who had had sex in the past 12 months (n=6,833).

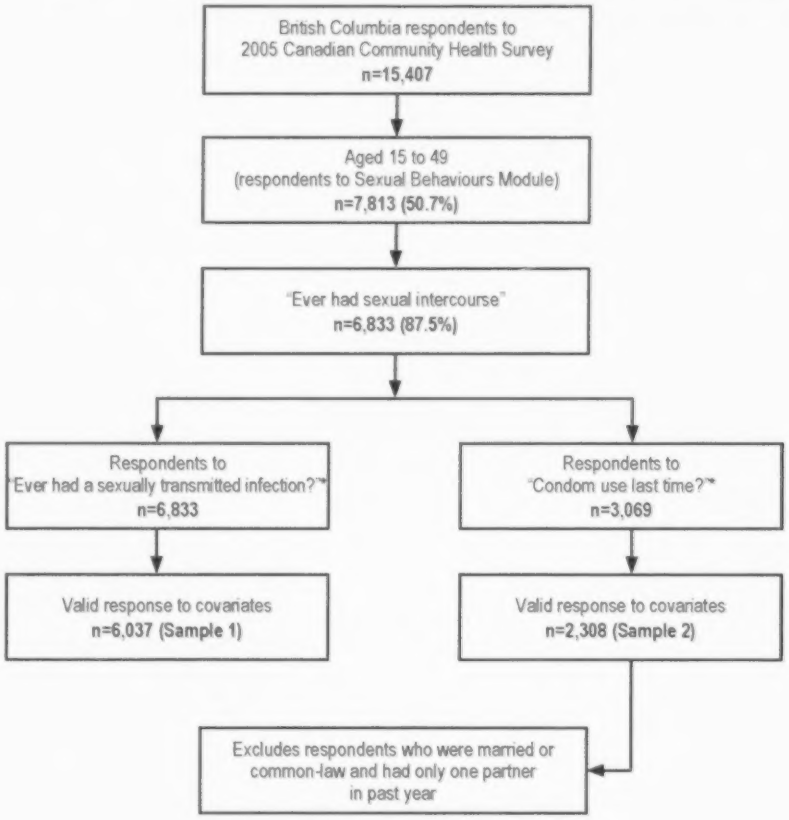
For condom use, Statistics Canada specified the subsample so as to capture a population at higher risk for STIs. Condom use was asked of those who had had sex in the past 12 months, and who were unmarried/not living common-law or married/living common-law but with more than one sexual partner in the past year (n=3,069).

For each outcome, respondents who answered "yes" or "no" and who had valid responses to the other variables used in this analysis were included in the final analytic subsamples: n=6,037 and n=2,308, respectively.

Region was defined as metropolitan and non-metropolitan, with the non-metropolitan regions further categorized as being in the north or south of the province. The public release database aggregated British Columbia respondents into 15 strata based on 16 health regions.[16] In this analysis, to investigate geographic differences, 2 of the 15 strata were categorized as "Northern non-metropolitan" (which comprises over half the area of province and approximately 8% of the population[22,23]); 8 as "Southern non-metropolitan"; and 5 as "metropolitan" (an urban area with a population of at least 100,000). It was hypothesized that the odds of having had an STI would be higher in metropolitan than non-metropolitan regions,[4] and that non-use of condoms would be higher in non-metropolitan regions, particularly the North, because of less access to STI clinics,[9-11] and because of the higher STI rates recently observed there.[4]

Two age groups were defined for this study: 15 to 24 and 25 to 49. It was hypothesized that the older age group would have greater odds of having had an STI, since they had more potential years of sexual activity than younger individuals, and that they would be less likely to use condoms because they perceive their relationships to be more stable and themselves at lower risk. Based on previous studies, it was hypothesized that women would be less likely than men to report using condoms, and more likely to have had an STI.[14,24-28] As well, it was expected that being married/common-law would reduce the odds of having had an STI.[29] The categories "married" and "common-law" included same-sex as well as heterosexual partnerships, although it

Figure 1
Derivation of study samples for sexual risk outcomes


British Columbia respondents to 2005 Canadian Community Health Survey
n=15,407
Aged 15 to 49 (respondents to Sexual Behaviours Module)
n=7,813 (50.7%)
"Ever had sexual intercourse"
n=6,833 (87.5%)
Respondents to "Ever had a sexually transmitted infection?"*
n=6,833
Respondents to "Condom use last time?"*
n=3,069
Valid response to covariates
n=6,037 (Sample 1)
Valid response to covariates
n=2,308 (Sample 2)
Excludes respondents who were married or common-law and had only one partner in past year

* Respondents screened into the Sexual Behaviour Module of Canadian Community Health Survey who answered "yes," "don't know," "no answer" or "not stated" to "Have you ever had sexual intercourse?" were asked subsequent questions, including "Ever had a sexually transmitted infection" and "Condom use during last intercourse"; those who responded "no" were excluded from subsequent questions in Module. Sample 2 included only respondents who had sex in past year and who were unmarried/not living common-law, or married/living common-law, but with more than one sexual partner in past year.
Source: 2005 Canadian Community Health Survey.

was not possible to differentiate between the two. Because alcohol consumption has been associated with risky sexual behaviour[30,31] (and therefore, potentially, STIs), it was included in the models as a potential confounding variable. Alcohol use was grouped into currently non-drinker, occasional drinker and regular drinker. Education rather than income was used as an indicator of socio-economic status because education had less missing data, and because income may not be the best measure for younger respondents.

What is already known on this subject?

- Although rates of sexually transmitted infections (STI) tend to be high in urban areas, recent research indicates that some STIs are becoming prevalent in non-metropolitan regions.
- Relatively high STI rates have been recorded in the northern health regions of British Columbia.
- Much attention focuses on STI risks in young people, but little research is devoted to risks among adult Canadians, particularly in northern areas.

What does this study add?

- People in Southern non-metropolitan regions of British Columbia were significantly less likely than those in metropolitan regions to have had an STI; non-use of condoms did not differ significantly by region.
- Regardless of region of residence, being older (25 to 49) was significantly associated with not using condoms.
- Women were more likely than men to have had an STI and to have not used a condom the last time they had sexual intercourse.

Analysis

Weighted prevalence estimates and 95% confidence intervals were calculated for sample characteristics and each outcome, by age and region. A model was created for previous STI and for non-use of condom at last sexual intercourse. Variables associated with each outcome at the bivariate level ($p<0.10$) using the likelihood ratio test were entered into the multivariate (adjusted) logistic regression model. Region was forced into the model to determine the relationship between this variable and the outcomes. For non-use of condom at last sexual intercourse, models stratified by geography were created to explore the interaction between age and region. Models were adjusted for age, sex, marital status and education. Reported p-values are two-sided, and odds ratios are reported at 95% confidence intervals. Normalized sampling weights were applied to all analyses to account for the complex sampling design.[17,32] The analysis was completed using SAS/STAT software Version 9 (Copyright, 2005 SAS Institute Inc.).

Results

Sample characteristics

Given the inclusion and exclusion criteria used by Statistics Canada for asking the questions in the Sexual Behaviour Module, the two analytic samples differed by age and marital status (Table 1). Education and type of

Table 1
Selected characteristics of sexual risk study outcomes samples, household population aged 15 to 49, British Columbia, 2005

	Sample 1 Valid responses to "ever diagnosed with sexually transmitted infection" and covariates (n=6,037)	Sample 2 Valid responses to "condom use last time had sexual intercourse"[1] and covariates (n=2,308)
	%	%
Total	**100.0**	**100.0**
Geographic area		
Northern non-metropolitan	7.2	5.7
Southern non-metropolitan	36.4	35.4
Metropolitan	56.4	58.9
Age group		
15 to 24	20.6	48.3
25 to 49	79.4	51.7
Sex		
Men	49.5	54.7
Women	50.5	45.3
Marital status		
Married	49.5	2.7
Common-law	11.4	2.0
Widowed/Separated/Divorced	6.8	13.8
Single/Never married	32.3	81.4
Education		
Less than secondary graduation	8.4	11.9
Secondary graduation	17.6	20.5
Some postsecondary	15.0	21.7
Postsecondary graduation	58.9	45.9
Type of drinker		
Currently non-drinker	12.0	6.3
Occasional	15.0	13.1
Regular	73.0	80.6

[1] had sex in past year and were unmarried/not living common-law or married/living common-law, but with more than one sexual partner in past year

Note: Excludes people who never had sexual intercourse

Source: 2005 Canadian Community Health Survey

drinker also varied between the samples, but to a lesser extent. The higher level of educational attainment in Sample 1 reflects the larger percentage of older respondents relative to Sample 2.

The samples were evenly distributed by sex, although women were slightly underrepresented in Sample 2. For both samples, the majority of respondents lived in metropolitan areas of British Columbia; 6% to 7% lived in Northern non-metropolitan regions.

Sexual behaviours

Just over 9% of sexually active British Columbia residents aged 15 to 49 reported having had an STI (Table 2). Regardless of age, the highest percentages were in metropolitan regions: 6.7% at ages 15 to 24; 10.8% at ages 25 to 49.

Of those who had sex in the past year and who were not married/not common-law, or who were married/common-law, but had more than one sexual partner in the past year, 44.3% reported not using a condom the last time they had sexual intercourse. At ages 25 to 49, the percentage was highest—62.5% —in Northern non-metropolitan regions. This compared with 58.0% of their counterparts in Southern non-metropolitan regions and 52.7% of those in metropolitan areas. At ages 15 to 24, the percentage did not differ substantially by region (around 45%).

Factors associated with having STI

At the bivariate level, all study variables were significantly associated with having had an STI (Table 3). In the multivariate model, residents of Southern non-metropolitan regions had significantly lower odds of having had an STI, compared with residents of metropolitan regions. The odds of having had an STI were significantly higher among 25- to 49-year-olds (compared with 15- to 24-year-olds), women (compared with men) and people with some postsecondary education (compared with postsecondary graduates), but significantly lower among those who were married (compared with single/never married) and among non-drinkers and occasional drinkers (compared with regular drinkers).

Non-use of condoms

In bivariate analysis, geographic region was the only selected covariate not significantly associated with condom non-use. Nonetheless, because the examination of geographic patterns was the primary aim of this study, it was retained in the final model. In the multivariate model, the odds of not using a condom also did not differ significantly for residents of Northern and Southern non-metropolitan regions, compared with residents of metropolitan regions (Table 3).

However, the odds of not using a condom were significantly higher for people aged 25 to 49 (compared with 15- to 24-year-olds) and women (compared with men), and significantly lower for people who reported being occasional drinkers (compared with regular drinkers) (Table 3). People with less than secondary graduation had significantly lower odds of not using a condom than did postsecondary graduates.

Separate multivariate analyses for each region showed that older age was associated with non-use of condoms in all regions (Table 4). The odds of condom non-use for older individuals were particularly strong in the northern non-metropolitan regions, even when adjusting for sex, education and type of drinker, indicating that this risk behaviour might be of more concern in this region. The odds of not using condoms were significantly higher for women compared with men in metropolitan and Southern non-metropolitan regions. Education and type of drinker were significant only in Southern non-metropolitan regions where people with less than secondary graduation and current non-drinkers had lower odds of not using condoms than did postsecondary graduates and regular drinkers, respectively.

Table 2
Percentage reporting sexual risk outcomes, by age group, household population aged 15 to 49, British Columbia, 2005

Age group/ Sexual risk outcome	Total	95% confidence interval		Northern non-metropolitan	95% confidence interval		Southern non-metropolitan	95% confidence interval		Metropolitan	95% confidence interval	
	%	from	to	%	from	to	%	from	to	%	from	to
Ever diagnosed with sexually transmitted infection												
Total	9.2	8.3	10.1	8.2	5.7	10.7	8.1	6.8	9.5	10.0	8.7	11.3
15 to 24	5.5	3.9	7.0	2.9	0.7	5.1	4.2	2.4	6.1	6.7	4.2	9.3
25 to 49	10.2	9.1	11.2	9.7	6.5	12.8	9.2	7.6	10.9	10.8	9.3	12.3
Did not use condom last time had sexual intercourse[†]												
Total	44.3	41.6	47.1	44.8	36.8	52.8	45.9	41.6	50.1	43.4	39.6	47.2
15 to 24	33.0	28.9	37.0	28.7	18.0	39.5	34.5	28.1	40.9	32.4	26.7	38.1
25 to 49	54.9	51.5	58.4	62.7	52.6	72.7	58.0	52.5	63.5	52.7	47.9	57.4

† had sex in past year and were unmarried/not living common-law or married/living common-law, but with more than one sexual partner in past year

Note: Excludes people who never had sexual intercourse

Source: 2005 Canadian Community Health Survey.

Discussion

Preventive interventions tend to be targeted at younger people, largely because they continue to have the highest rates of STIs.[4,33] In fact, the Public Health Agency of Canada recognizes being younger than 25 as a risk factor.[13,34] Nonetheless, from 1997 to 2007, STI rates rose faster among middle-aged Canadians than among younger adults.[35]

Table 3
Unadjusted and adjusted odds ratios relating sexual risk outcomes to selected characteristics, household population aged 15 to 49, British Columbia, 2005

	Ever diagnosed with sexually transmitted infection						Did not use condom last time had sexual intercourse					
		95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval	
Characteristics	Unadjusted odds ratio	from	to	Adjusted odds ratio	from	to	Unadjusted odds ratio	from	to	Adjusted odds ratio	from	to
Geographic area												
Northern non-metropolitan	0.79*	0.66	0.96	0.82	0.57	1.18	1.10	0.74	1.52	1.15	0.79	1.67
Southern non-metropolitan	0.87	0.73	1.03	0.79*	0.65	0.96	1.11	0.93	1.32	1.15	0.96	1.39
Metropolitan†	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..
Likelihood ratio test (p-value)	6.37 (p=0.040)						1.31 (p=0.52)					
Age group												
15 to 24†	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..
25 to 49	1.96*	1.57	2.44	2.67*	1.96	3.62	2.48*	2.09	2.94	2.47*	2.05	2.97
Likelihood ratio test (p-value)	32.49 (p<0.001)						113.0 (p<0.001)					
Sex												
Women	1.27*	1.07	1.52	1.31*	1.09	1.57	1.45*	1.23	1.71	1.52*	1.28	1.80
Men†	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..
Likelihood ratio test (p-value)	7.28 (p=0.007)						19.10 (p<0.001)					
Marital status												
Married	0.90	0.76	1.10	0.64*	0.51	0.81	..	..	..	..	..	..
Common-law	1.65*	1.26	2.16	1.27	0.96	1.69	..	..	..	..	..	..
Widowed/Separated/Divorced	1.76*	1.28	2.42	1.19	0.85	1.67	..	..	..	..	..	..
Single/Never married†	1.00	..	..	1.00	..	..	..	..	..	..	..	..
Likelihood ratio test (p-value)	34.79 (p<0.001)											
Education												
Less than secondary graduation	0.74	0.55	1.00	1.00	0.69	1.44	0.46*	0.35	0.61	0.70*	0.52	0.95
Secondary graduation	0.78*	0.63	0.96	0.93	0.71	1.20	0.65*	0.52	0.80	0.94	0.74	1.19
Some postsecondary	1.32*	1.08	1.60	1.60*	1.25	2.03	0.86	0.69	1.07	1.21	0.96	1.54
Postsecondary graduation†	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..
Likelihood ratio test (p-value)	14.82 (p=0.002)						38.60 (p<0.001)					
Type of drinker												
Currently non-drinker	0.61*	0.44	0.83	0.59*	0.43	0.81	0.64*	0.45	0.91	0.89	0.68	1.13
Occasional	0.77	0.59	1.00	0.74*	0.57	0.97	0.85	0.67	1.09	0.58*	0.41	0.84
Regular†	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..
Likelihood ratio test (p-value)	13.50 (p=0.001)						7.36 (p=0.025)					

* significantly different from estimate for reference category
† reference category
.. not applicable

Notes: Excludes people who never had sexual intercourse. Marital status was removed from model for "Did not use condom last time had sexual intercourse," because sample includes only respondents who had sex in past year and who were unmarried/not living common-law or married/living common-law, but with more than one sexual partner in past year.

Source: 2005 Canadian Community Health Survey.

In the context of this trend, the results of the current analysis are thought-provoking. Non-use of condoms was more prevalent among British Columbians aged 25 to 49 than among those aged 15 to 24. This pattern held in all regions, even when sex, educational attainment and alcohol consumption were taken into account. A population-based American study also found that in most states, condom use decreased with age,[36] although it is not clear if the exclusion criteria were similar to those of the CCHS.

Little research has sought to explain condom non-use among 25- to 49-year-olds. It may be that older people experience more embarrassment in using condoms[37] and are less prepared to negotiate condom use. They may have comparatively little exposure to STI education,[38] or they may perceive that their partner is not open to condom use. As well, older individuals may depend more on alternate methods of birth control such as the contraceptive pill, be more likely to get tested for STIs, have a better idea of the STI status of their partner, and perceive that they are in partnerships with lower risk for STIs. Nonetheless, condoms remain the only effective means of birth control that also prevent transmission of STIs, which are frequently asymptomatic. Additional research is required to investigate older Canadians' reasons for not using condoms, and their risk for STIs.

The odds of previous STIs were lower among residents of Southern non-metropolitan regions, compared with residents of metropolitan areas; the odds of previous STIs among residents of

Table 4
Unadjusted and adjusted odds ratios relating non-use of condoms at last sexual intercourse to selected characteristics, by geographic region, household population aged 15 to 49, British Columbia, 2005

	Did not use condom last time had sexual intercourse															
	Northern non-metropolitan						Southern non-metropolitan						Metropolitan			
	Unadjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval		Unadjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval		Unadjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval	
Characteristics		from	to		from	to		from	to		from	to		from	to		from	to
Age																		
15 to 24†	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..
25 to 49	4.16*	2.00	8.66	4.10*	1.82	9.26	2.62*	1.98	3.48	2.40*	1.76	3.25	2.32*	1.86	2.89	2.41*	1.88	3.09
Likelihood ratio test (p-value)	14.55 (p<0.001)						44.56 (p<0.001)						55.42 (p<0.001)					
Sex																		
Women	1.63	0.81	3.27	1.61	0.75	3.46	1.52*	1.15	2.00	1.59*	1.18	2.14	1.38*	1.12	1.72	1.47*	1.17	1.83
Men†	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..
Likelihood ratio test (p-value)	1.91 (p=0.17)						8.69 (p=0.003)						8.71 (p=0.003)					
Education																		
Less than secondary	0.36*	0.13	0.97	0.66	0.22	1.97	0.35*	0.23	0.54	0.53*	0.33	0.85	0.58*	0.38	0.87	0.92	0.59	1.42
Secondary graduation	0.56	0.23	1.40	1.08	0.39	3.00	0.90	0.63	1.27	1.24	0.85	1.81	0.80	0.62	1.03	1.15	0.84	1.60
Some postsecondary	0.68	0.23	2.05	1.10	0.33	3.71	0.56*	0.38	0.82	0.74	0.49	1.12	0.69*	0.53	0.91	1.04	0.78	1.41
Postsecondary graduation†	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..
Likelihood ratio test (p-value)	4.79 (p=0.19)						28.81 (p<0.001)						12.05 (p=0.007)					
Type of drinker																		
Currently not drinker	X	X	X	X	X	X	0.49	0.26	1.15	0.47*	0.23	0.96	0.76	0.50	1.16	0.68	0.44	1.05
Occasional	0.48	0.19	1.23	0.64	0.23	1.74	0.74	0.48	1.15	0.81	0.51	1.30	0.99	0.72	1.36	0.96	0.69	1.33
Regular†	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..	1.00	..	..
Likelihood ratio test (p-value)	3.32 (p=0.19)						5.96 (p=0.051)						1.71 (p=0.430)					

* significantly different from estimate for reference category
† reference category
.. not applicable
X suppressed to meet confidentiality requirements of *Statistics Act*
Notes: Marital status was removed from model, because sample includes only respondents who had sex in past year, and who were unmarried/not living common-law or married/living common-law, but with more than one sexual partner in past year.
Source: 2005 Canadian Community Health Survey.

Northern non-metropolitan regions did not differ significantly from those of metropolitan residents. People living in some urban neighbourhoods who have high STI risks[39] may not have been included in the CCHS, particularly if they were homeless or did not have access to telephones (the means by which CCHS interviewers contact potential participants). Alternatively, the lack of a significant difference in the self-reported prevalence of previous STIs between metropolitan and Northern non-metropolitan regions may reflect the recent increase in bacterial STIs in the latter.[1]

The prevalence of self-reported STIs in non-metropolitan regions may be underestimated if high-risk populations, particularly migrant men affiliated with resource-based industries, were missed during CCHS sampling.

The lack of a significant difference in the odds of having had an STI in metropolitan regions and Northern non-metropolitan regions may also be due to the survey year—2005. This year may have been too early in the North's resource-based boom to detect an upturn in the STI rate, though perhaps early enough to record an increase in unsafe behaviour such as not using condoms.

The stronger association between older age and condom non-use during last sex in Northern non-metropolitan region compared with the other two regions suggests an interaction effect between age and geographic location that should be investigated in future studies. Unobserved heterogeneity in different samples may be an issue for comparing the stratified analysis directly[40]; however, because the data exhibit effect modification, it is important to examine the stratified analysis, which still conveys information about the pattern of variation in the stratum-specific estimates.[41]

It may be particularly important to study factors that increase risk for STIs among older Canadians in northern and remote communities. In these large, sparsely populated areas, authorities often struggle to provide sexual health services.[42,43] Youth in northern British Columbia have limited opportunities to obtain STI testing and treatment[8-11]; it is likely that people of all ages in these regions encounter similar barriers.[10] Small populations in remote communities can reduce anonymity for those seeking STI testing and treatment and also result in individuals knowing their partners better, which could contribute to condom non-use.[42,44,45]

Strengths and limitations

This study is based on self-reported sexual behaviour, a subject that respondents may consider sensitive, thereby biasing their answers toward positive health behaviours. This may be more common

in regions with small populations, where privacy and confidentiality might be of more concern. About one in ten respondents (10.7%) did not answer the question about previous STIs, and 23.8% did not answer the question about condom use. Nonetheless, large samples were available for analysis of these two outcomes: 6,037 and 2,308, respectively.

While self-reported STIs are not a precise measure of prevalence, even STI surveillance does not capture all cases, many of which are asymptomatic and never formally diagnosed. However, self-reports of STIs have been used as an outcome in previous studies as a marker for risk.[29,46-48]

Because the type of condom (female versus male) was not specified, condom use may be underestimated.[11] If both types were used in a relationship, respondents might have replied negatively if the other partner had used condoms the last time they had intercourse. Since male condoms are used more commonly, women may have a greater chance than men of misinterpreting the question. In fact, consistent with other studies,[14,24,49] in this analysis, women were less likely than men to report using a condom.

By restricting the sample that could respond to condom use during last intercourse, Statistics Canada intended to target a "higher-risk" population (had sex in the past 12 months; were unmarried/not living common-law, or married/living common-law, but with more than one sexual partner in past year). However, this strategy may have missed some high-risk individuals, such as people in a relationship with someone who has other partners. At the same time, some low-risk individuals may have been included; for example, people who were not in a relationship and had only one sexual partner in the past year.

Because previous CCHS cycles did not ask the same questions, trends in STIs and non-use of condoms cannot be determined.

Conclusion

This study suggests the value of investigating geographic variations in factors associated with the risk of STIs. A comprehensive assessment of socio-cultural, socio-demographic and structural barriers to using condoms, to STI testing, and to getting treatment and information is vital for effective and site-specific prevention programs, and ultimately, reducing the incidence of STIs. Geographic analysis can help to target interventions and direct scarce resources toward areas with the greatest need.[50] Studies that use structural-level geographic space as a proxy for underlying risk factors for STIs can identify areas that may be overlooked by a traditional epidemiological approach.[3,40] As well, clusters of STI cases can indicate areas where residents are at greater risk.[35,51]

The results of this analysis also highlight the importance of considering older individuals in preventive interventions. Additional research is needed to explore factors associated with risks for STIs in older Canadians and their reasons for not using condoms. ■

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